Beers Criteria

Potentially Harmful Drugs in the Elderly: Beers List and More

(B=Beers list drug; C=Canadian list drug)

Drug	Concern	Alternative Treatment
Analgesics		
Ketorolac (*Toradol*) (B); long-term use (C)	GI bleeding. [5]	Mild pain: APAP, short-acting NSAID (e.g., ibuprofen) Moderate or severe pain: morphine, hydrocodone/APAP (*Vicodin*, etc), oxycodone (*OxyContin*, etc), oxycodone/APAP (*Percocet*, etc), fentanyl patch (*Duragesic*) [19] Topicals (neuropathic pain, arthritis): lidocaine (*Lidoderm*), capsaicin (*Zostrix*, etc)
Meperidine[a] (*Demerol*) (B); long-term use (C)	Not effective at commonly used oral doses; confusion, falls, factures, dependency, withdrawal [5,15]	
Pentazocine (*Talwin*) (B); long-term use (C)	More CNS effects (e.g., confusion, hallucinations) than other opioids; ceiling to analgesic effect [5]	
Propoxyphene (e.g., Darvon, etc) (B)	No better than acetaminophen, but has narcotic AE [5]	
Antidepressants		
Amitriptyline (*Elavil*) (B, C), doxepin (*Sinequan*, etc) (B), imipramine (*Tofranil*) (C)	Anticholinergic AE, sedation, urinary retention or incontinence, constipation, arrhythmias, falls [5,15]	Tricyclic without active metabolites (Nortriptyline [*Pamelor*], desipramine [*Norpramin*]) [15] Trazodone (for insomnia) [19] SSRI [15] Bupropion (*Wellbutrin*) (for cardiac patient) [19] Mirtazapine (*Remeron*) (for insomnia or anorexia) [19] Neuropathic pain: topicals (lidocaine [*Lidoderm*], capsaicin [*Zostrix*, etc])
Bupropion (*Wellbutrin*), seizure disorder (B)	May cause seizure [5]	Tricyclic without active metabolites (Nortriptyline [*Pamelor*], desipramine [*Norpramin*]) [15] Trazodone (for insomnia) [19] SSRI [15] Mirtazapine (*Remeron*) (for insomnia or anorexia) [19]
Fluoxetine (*Prozac*) used daily (B)	Long half-life; agitation, insomnia, anorexia [5]	SSRI with shorter half-life (e.g., escitalopram [*Lexapro*], sertraline [*Zoloft*])
Tricyclic for depression in patient with postural hypotension, BPH, glaucoma, heart block (C)	Fall risk; urinary retention; worsening glaucoma, heart block [15]	SSRI, with blood pressure monitoring [15]
Tricyclic in patient with stress incontinence or bladder outflow obstruction (B)	Urinary retention or incontinence [5]	Antidepressant with little anticholinergic or alphablocking effect (e.g., citalopram [*Celexa*]), bupropion [*Wellbutrin*])
SSRIs in patient with SIADH (B)	May cause or worsen SIADH [5]	Tricyclic without active metabolites (Nortriptyline [*Pamelor*], desipramine [*Norpramin*]) [15] Trazodone (for insomnia) [19] Bupropion (*Wellbutrin*) (for cardiac patient) [19] Mirtazapine (*Remeron*) (for insomnia or weight loss) [19]
SSRI in patient on MAOI (C)	Enhanced SSRI side effects [15]	Avoid combination. If switching from MAOI to another antidepressant, ensure a 14-day washout. If switching from another antidepressant to an MAOI, minimum washout is 2 weeks for drug without long half-life and 5 weeks for drug with long half-life (e.g., fluoxetine). [30]

Drug	Concern	Alternative Treatment
Antihistamines		
Antihistamines, anticholinergic (B): Chlorpheniramine (*Chlor-Trimeton*, etc), Cyproheptadine (*Periactin*), Dexchlorpheniramine (*Polaramine*), Diphenhydramine (*Benadryl*, etc), Hydroxyzine (*Vistaril, Atarax*), Promethazine (*Phenergan*, etc)	Anticholinergic AE, urine retention, confusion, sedation [5]	Cetirizine (*Zyrtec*), fexofenadine (*Allegra*), loratadine (Claritin), desloratadine (Clarinex), levocetirizine (*Xyzal*), low-dose diphenhydramine[19,26]
Antihypertensives		
Alpha-blockers (doxazosin [*Cardura*], prazosin [*Minipress*], terazosin [*Hytrin*])(B)	Hypotension, dry mouth, incontinence [5]	Thiazide, ACE inhibitor, beta-blocker, calcium channel blocker[22]
Clonidine (*Catapres*) (B)	Orthostatic hypotension, CNS AE [5]	Thiazide, ACE inhibitor, beta-blocker, calcium channel blocker[22]
Ethacrynic acid (*Edecrin*) (B)	Hypotension; fluid, electrolyte imbalances [5]	Furosemide (*Lasix*), bumetanide (*Bumex*)
Guanethidine (B)	Orthostatic hypotension, depression [5]	Thiazide, ACE inhibitor, beta-blocker, calcium channel blocker[22]
Methyldopa (*Aldomet)* (B)	Bradycardia; depression [5]	Thiazide, ACE inhibitor, beta-blocker, calcium channel blocker [22]
Nifedipine, shortacting (*Procardia, Adalat*) (B)	Hypotension, constipation [5]	Another calcium channel blocker or longacting nifedipine
Reserpine >0.25mg (B, C)	Depression, impotence, sedation, orthostatic hypotension, extrapyramidal effects [5,15]	Thiazide, ACE inhibitor, beta-blocker, calcium channel blocker [22]
Thiazide in patient with gout (C)	Depression, impotence, sedation, orthostatic hypotension, extrapyramidal effects [5,15]	Thiazide, ACE inhibitor, beta-blocker, calcium channel blocker [22]
Antiplatelet Drugs		
Dipyridamole, shortacting (*Persantine*) (B); for dementia or stroke (C)	Ineffective for stroke prevention & dementia; orthostatic hypotension [5,15]	For stroke prevention: low-dose aspirin, clopidogrel (*Plavix*), aspirin/dipyridamole (*Aggrenox*) [19]
Ticlopidine (*Ticlid*) (B)	Not more effective than aspirin, but more toxic [5]	Low dose aspirin, clopidogrel (*Plavix*), aspirin/dipyridamole (*Aggrenox*) [19]

Drug	Concern	Alternative Treatment
Antipsychotics		
Mesoridazine (*Serentil*) (B), Thioridazine (*Mellaril*) (B)	CNS AE, seizures, extrapyramidal effects [5]	Risperidone (*Risperdal*)*, haloperidol (*Haldol*) [26] *Atypicals associated with increased mortality when used to treat behavioral problems in elderly with dementia [31]
Chlorpromazine (*Thorazine*) in patient with history of postural hypotension (C)	Fall risk [15]	Haloperidol, with blood pressure monitoring [15]
Clozapine (*Clozaril*) in patient with seizures (B)	Lower seizure threshold [5]	Risperidone (*Risperdal*)*, haloperidol (*Haldol*) [26] *Atypicals associated with increased mortality when used to treat behavioral problems in elderly with dementia [31]
Olanzapine (*Zyprexa*), obesity (B)	Increased appetite, weight gain	Risperidone (*Risperdal*)*, haloperidol (*Haldol*) [26] *Atypicals associated with increased mortality when used to treat behavioral problems in elderly with dementia[31]
Thiothixene (*Navane*), in patient with seizure disorder (B)	Lower seizure threshold [5]	Risperidone (*Risperdal*)*, haloperidol (*Haldol*) [26] *Atypicals associated with increased mortality when used to treat behavioral problems in elderly with dementia [31]
Anxiolytics		
Long-acting benzodiazepines (B, C): clorazepate (*Tranxene*, etc), chlordiazepoxide (*Librium*), diazepam (*Valium*), quazepam (*Doral*)	Dependence, depression, prolonged sedation, confusion, falls, fractures, respiratory depression in COPD, incontinence [5,15]	For anxiety: shorter acting benzodiazepines (appropriately dosed) (alprazolam [*Xanax*],lorazepam [*Ativan*], oxazepam [*Serax*]; buspirone (*Buspar*),[15,19] For sleep: nondrug therapy (See our *Detail-Document* #211015 [U.S.]/#210918 [Canada]); temazepam (*Restoril*) 7.5 mg*, zolpidem (*Ambien*) 5 mg*, Ambien CR 6.25 mg, zaleplon (*Sonata*) 5 mg*, ramelteon (*Rozerem*) 8 mg, eszopiclone (*Lunesta*) 1 mg* for difficulty falling asleep, 2 mg for difficulty staying asleep [15,19,32] ***Initial dose**
Short-acting benzodiazepines, daily doses greater than (B): alprazolam (*Xanax*) 2 mg, lorazepam (*Ativan*) 3 mg, oxazepam (*Serax*) 60 mg	Falls [5]	For anxiety: shorter acting benzodiazepines (appropriately dosed) (alprazolam [*Xanax*],lorazepam [*Ativan*], oxazepam [*Serax*]; buspirone (*Buspar*)15,19 For sleep: nondrug therapy (See our *Detail-Document* #211015 [U.S.]/#210918 [Canada]); temazepam (*Restoril*) 7.5 mg*, zolpidem (*Ambien*) 5 mg*, Ambien CR 6.25 mg, zaleplon (*Sonata*) 5 mg*, ramelteon (*Rozerem*) 8 mg, eszopiclone (*Lunesta*) 1 mg* for difficulty falling asleep, 2 mg for difficulty staying asleep [15,19,32] ***Initial dose**
Meprobamate (*Miltown*) (B)	Dependence, sedation [5]	

Drug	Concern	Alternative Treatment
Cardiac Drugs		
Amiodarone (*Cordarone, Pacerone*) (B)	QT prolongation, torsades de pointes, lack of efficacy in elderly [5]	Depends on type of arrhythmia; flecainide (*Tambocor*), sotalol (*Betapace*), beta-blocker, dofetilide (*Tikosyn*) [27]
Beta-blockers in patient with asthma, COPD, or Raynaud's disease (C) [15]	Worsening disease [15]	Alternate antihypertensive; nitrate or calcium channel blocker [15]
Calcium channel blocker in patient with systolic heart failure (C) or chronic constipation (B, C)	Worsening heart failure; constipation [5,15]	Diuretic, ACE inhibitor, appropriately titrated betablocker [15]
Digoxin (*Lanoxin*) doses >0.125 mg/d except for atrial arrhythmias (B)	Toxicity due to reduced renal clearance [5]	Dose reduction, with monitoring [19]
Disopyramide (*Norpace*) (B, C)	Negative inotrope; anticholinergic; sudden death [5,15]	Depends on type of arrhythmia; for atrial fibrillation, digoxin, quinidine, procainamide, sotalol, flecainide [15,27]
Diabetes Drugs		
Chlorpropamide (*Diabinese*) (B)	Prolonged hypoglycemia; SIADH [5]	Glimepiride (*Amaryl*), glipizide (*Glucotrol*) [19] Avoid glyburide (*Micronase*, etc) and *Glucotrol XL* due to hypoglycemia risk. [33]
Gastrointestinal Drugs		
[Antispasmodics, longterm use (B); for IBS in dementia patient (C): belladonna alkaloids (*Donnatal*), Clindinium (in *Librax*), Dicyclomine (*Bentyl*), Hyoscyamine (*Levsin*, etc), Propantheline (*Pro-Banthine*)	Anticholinergic AE; worsened cognition & behavioral roblems in dementia; urinary retention or incontinence; questionable efficacy [5,15]	Diet therapy (fiber, fluids) [15,23] Constipation: Psyllium, polyethylene glycol (*Miralax*, etc), stool softener (e.g., docusate), lubiprostone (*Amitiza*) [19,23] Diarrhea: loperamide (*Imodium*, etc), aluminum hydroxide (e.g., *AlternaGel*), cholestyramine (*Questran*, etc) [15,19]
Cimetidine (*Tagamet*) (B); in patient taking warfarin (C)	Confusion, other CNS AE, interaction with warfarin [5,15]	Alternative H2 blocker (ranitidine [*Zantac*], famotidine [*Pepcid*], nizatidine [*Axid*]) [15]
Diphenoxylate (*Lomotil*, etc), longterm use (C)	Dependence, sedation, cognitive impairment [15]	Change in diet; loperamide (*Imodium*, etc) [15]
Metoclopramide (*Reglan*) in patient with Parkinson's disease (B)	Antidopaminergic effect [5]	Nausea: ondansetron (*Zofran*), granisetron (*Kytril*), dolasetron (*Anzemet*) [19]
Mineral oil (B)	Aspiration [5]	Diet therapy (fiber, fluids) [15,23] Constipation: Psyllium, polyethylene glycol (*Miralax*, etc), stool softener (e.g., docusate), lubiprostone (*Amitiza*) [19,2]
Stimulant laxatives (e.g., bisacodyl [*Dulcolax*, etc]), longterm use, except with opiates (B)	May worsen bowel function [5]	Diet therapy (fiber, fluids) [15,23] Constipation: Psyllium, polyethylene glycol (*Miralax*, etc), stool softener (e.g., docusate), lubiprostone (*Amitiza*) [19,2]
Trimethobenzamide (*Tigan*) (B)	Poor efficacy; extrapyramidal AE [5]	Ondansetron (*Zofran*), granisetron (*Kytril*), dolasetron (*Anzemet*) [19] Prochlorperazine (*Compazine*, etc), metoclopramide (*Reglan*) (avoid long-term use, and avoid in Parkinson's disease) [26]

Drug	Concern	Alternative Treatment
Hormones		
Estrogens (oral) (*Premarin*, etc) (B)	Breast, endometrial cancer; not cardioprotective [5]	Hot flashes: nondrug therapy (cool environment, layered clothing, cool compress), SSRIs, gabapentin, venlafaxine [24] Bone density: calcium, vitamin D, bisphosphonates, raloxifene (*Evista*)
Methyltestosterone (*Android*, etc) (B)	Prostatic hyperplasia, cardiac AE [5]	None
Thyroid, desiccated (B)	Cardiac AE [5]	Levothyroxine (*Levoxyl, Synthroid,* etc)
Hypnotics		
Barbiturates, except phenobarbital for seizures (B); longterm for insomnia (C)	Dependence; higher risk of AE (falls, fractures, confusion, cognitive impairment) than other hypnotics [5,15]	Nondrug therapy (See our *Detail-Document* #211015 [U.S.]/ #210918 [Canada]); temazepam (*Restoril*) 7.5 mg*, zolpidem (*Ambien*) 5 mg*, *Ambien CR* 6.25 mg, zaleplon (*Sonata*) 5 mg*, ramelteon (*Rozerem*) 8 mg, eszopiclone (*Lunesta*) 1 mg* for difficulty falling asleep, 2 mg for difficulty staying asleep [15,19,32] ***Initial dose**
Long-acting benzodiazepines (B, C) (See entry under Anxiolytics)	See entry under Anxiolytics.	See entry under Anxiolytics.
Diphenhydramine (Benadryl, etc) (B)	Confusion, sedation, anticholinergic effects [5]	Nondrug therapy (See our *Detail-Document* #211015 [U.S.]/ #210918 [Canada]); temazepam (*Restoril*) 7.5 mg*, zolpidem (*Ambien*) 5 mg*, *Ambien CR* 6.25 mg, zaleplon (*Sonata*) 5 mg*, ramelteon (*Rozerem*) 8 mg, eszopiclone (*Lunesta*) 1 mg* for difficulty falling asleep, 2 mg for difficulty staying asleep [15,19,32] ***Initial dose**
Flurazepam (Dalmane) (B)	Sedation, falls, accumulation [5]	Nondrug therapy (See our *Detail-Document* #211015 [U.S.]/ #210918 [Canada]); temazepam (*Restoril*) 7.5 mg*, zolpidem (*Ambien*) 5 mg*, *Ambien CR* 6.25 mg, zaleplon (*Sonata*) 5 mg*, ramelteon (*Rozerem*) 8 mg, eszopiclone (*Lunesta*) 1 mg* for difficulty falling asleep, 2 mg for difficulty staying asleep [15,19,32] ***Initial dose**
Triazolam (Halcion) (C)	Cognitive/behavioral disturbances [15]	Nondrug therapy (See our *Detail-Document* #211015 [U.S.]/ #210918 [Canada]); temazepam (*Restoril*) 7.5 mg*, zolpidem (*Ambien*) 5 mg*, *Ambien CR* 6.25 mg, zaleplon (*Sonata*) 5 mg*, ramelteon (*Rozerem*) 8 mg, eszopiclone (*Lunesta*) 1 mg* for difficulty falling asleep, 2 mg for difficulty staying asleep [15,19,32] ***Initial dose**
Muscle Relaxants		
Muscle relaxants (B): Carisoprodol (*Soma*), Chlorzoxazone, Cyclobenzaprine (*Flexeril*) (C), Metaxalone (*Skelaxin*), Methocarbamol (*Robaxin*) (C), Orphenadrine (*Norflex*)	Anticholinergic effects, sedation, cognitive impairment, weakness, urine retention; questionable efficacy at lower doses [5]	Physiotherapy; correct seating & footwear [15,19] For *spasticity*, use antispasmodics (e.g, baclofen, tizanidine [*Zanaflex*]) or nerve blocks; treat problems that may worsen condition [19]

Drug	Concern	Alternative Treatment
NSAIDs		
Aspirin for pain in patient on warfarin (C)	Bleeding [15]	Acetaminophen [15]
NSAIDs, longer halflife, full dose, long duration (B): Naproxen (*Aleve, Naprosyn*, etc), Oxaprozin (*Daypro*), Piroxicam (*Feldene*) (C)	GI bleeding, renal failure, hypertension, heart failure [5]	Ibuprofen (Motrin, Advil, etc), acetaminophen, topical agents (e.g., lidocaine patch [Lidoderm], capsaicin [Zostrix, etc]), choline magnesium trisalicylate (Trilisate); start with lowest dose and increase slowly [19] *See Detail-Document #221003, "Cardiovascular Risks of NSAIDs and COX-2 inhibitors"
Indomethacin (Indocin) (B); longterm use (C)	CNS AE, GI effects, fluid retention [5,15]	Ibuprofen (*Motrin, Advil*, etc), acetaminophen, topical agents (e.g., lidocaine patch [*Lidoderm*], capsaicin [*Zostrix*, etc]), choline magnesium trisalicylate (*Trilisate*); start with lowest dose and increase slowly [19] Gout, chronic treatment: allopurinol [15] Gout, acute: alternative NSAID, short-term indomethacin [15,19]
NSAID, long-term for osteoarthritis (C)	GI bleeding, renal failure, hypertension, heart failure [15]	Acetaminophen,15 capsaicin [*Zostrix*, etc]
NSAID for osteoarthritis patient receiving warfarin (C)	Bleeding risk [15]	Acetaminophen; NSAID with gastroprotective agent (e.g., proton pump inhibitor; misoprostol [*Cytotec*]), [15] capsaicin [*Zostrix*, etc]
NSAID in patient with history of peptic ulcer (B, C)	New ulcers; bleeding risk [5,15]	Acetaminophen; NSAID with gastroprotective agent (e.g., proton pump inhibitor; misoprostol [*Cytotec*]) [15]
NSAID, long-term in patient with hypertension (C)	Worsening hypertension [15]	Acetaminophen [15]
Respiratory Drugs		
Corticosteroids, oral, long-term for COPD, patient with diabetes (C)	Worsening glucose control [15]	Inhaled corticosteroid and bronchodilator [15]
Pseudoephedrine in patient with hypertension or bladder outflow obstruction(B)	Increased blood pressure; incontinence [5]	Saline nasal spray, nasal steroid [25]
Theophylline, patient with insomnia (B)	May contribute to insomnia [5]	Inhaled corticosteroid and bronchodilator
Stimulant Drugs		
Amphetamines, anorexics (B)	Dependence, hypertension, myocardial ischemia, CNS stimulation (agitation, insomnia) [5]	For weight control: Diet and lifestyle modification; For depression: Tricyclic without active metabolites (Nortriptyline [*Pamelor*], desipramine [*Norpramin*]) [15] Trazodone [19] SSRI [15] Bupropion (*Wellbutrin*) (for cardiac patient) [19] Mirtazapine (*Remeron*) (for insomnia or anorexia) [19]
Any stimulant in patient with anorexia/malnutrition (B)	Appetite suppression [5]	For depression: Tricyclic without active metabolites (Nortriptyline [*Pamelor*], desipramine [*Norpramin*]) [15] Trazodone (for insomnia) [19] SSRI [15] Mirtazapine (*Remeron*) (for insomnia or anorexia) [19]
Methylphenidate for depression (C)	CNS stimulation, agitation, seizures [15]	Tricyclic without active metabolites (Nortriptyline [*Pamelor*], desipramine [*Norpramin*]) [15] Trazodone [19] SSRI [15] Bupropion (*Wellbutrin*) (for cardiac patient) [19] Mirtazapine (*Remeron*) (for insomnia or anorexia) [19]

Drug	Concern	Alternative Treatment
Urinary Drugs		
Nitrofurantoin (*Macrodantin*, etc) (B)	Nephrotoxicity [5]	Depends on infection
Oxybutynin [b] (*Ditropan*), in patient with bladder outflow obstruction (B)	Urine retention, confusion, hallucinations, sedation [5,34]	For urge incontinence: Behavioral therapy (e.g., urge suppression, bladder retraining) [28] For BPH: 5-alpha-reductase inhibitor (finasteride [*Proscar*], dutasteride [*Avodart*])
Tolterodine [b] (*Detrol*) in patient with bladder outflow obstruction (B)	Urinary retention, confusion, hallucinations, sedation [5,34]	For urge incontinence: Behavioral therapy (e.g., urge suppression, bladder retraining) [28] For BPH: 5-alpha-reductase inhibitor (finasteride [*Proscar*], dutasteride [*Avodart*])
Miscellaneous		
Anticholinergic (e.g., trihexyphenidyl) to manage antipsychotic extrapyramidal effects (C)	Agitation, delirium, cognitive impairment [15]	Decrease antipsychotic dose or discontinue; [15] atypical antipsychotic
Ergot mesylates (*Hydergine*) (B)	Unproven efficacy [5]	Donepezil (*Aricept*), rivastigmine (*Exelon*), etc.
Ferrous sulfate >325 mg per day (B)	Constipation, without increased iron absorption [5]	None
Isoxsuprine (*Vasodilan)* (B)	Lack of efficacy [5]	Exercise (for peripheral arterial disease)
Sodium containing drugs in heart failure (B)	Worsening heart failure [5]	Various, depending on drug & indication

ACE – angiotensin converting enzyme, AE – adverse effects, APAP – acetaminophen, B – Beers list drug, BPH – benign prostatic hyperplasia, C – Canadian list drug, CNS – central nervous system, COX – cyclooxygenase, GI – gastrointestinal, IBS – irritable bowel syndrome, MAOI – monoamine oxidase inhibitor, NSAID – nonsteroidal anti-inflammatory drug, SIADH – syndrome of inappropriate diuretic hormone secretion, SSRI – selective serotonin reuptake inhibitor

a. Meperidine: while not mentioned specifically in Beers/Canadian listings, meperidine should be used cautiously in all elderly patients due to increased risk of seizures with renal impairment.26

b. Since the Beers list was last published, newer agents for overactive bladder (OAB) have been developed. All OAB drugs should be avoided in patients with bladder outlet obstruction. For a listing of these agents see Detail-Documents #210209 (U.S.) and #220616 (Canada).

Preventing Adverse Drug Events in the Elderly: the Role of the Beers List

Another Round of Beers

In 1991, Dr. Mark Beers published a methods paper describing the development of a consensus list of medicines considered to be inappropriate for long-term care facility residents. [4] The Beers criteria or "Beers list" is now in its third permutation. [5,6] Some medications are of concern in all elderly patients, but others are of concern only in certain situations (e.g., bupropion in patient with seizure disorder). [5]

The Beers list was originally constructed specifically for long-term care, but it has been revised for use in hospital, outpatient, managed care, and other settings. The Beers list has been used to evaluate clinical drug use, to study the effect of intervention on reducing adverse drug effects in older patients, and to analyze computerized administrative data sets. [7-13]

The Beers list is increasingly being used as a quality measure. The Centers for Medicare & Medicaid Services (CMS) has adopted the Beers list to regulate long-term care facilities. In 2006, the Health Plan Employer Data and Information Set (HEDIS) used Beers list to create a list of medications used to assess quality of managed care plans. They plan to expand this in 2007. [14]

There is also a "Canadian criteria" list. These criteria for inappropriate prescribing practices in elderly people were developed by a national consensus panel in Canada. [15] The Canadian criteria give more consideration to indication, comorbidities, and duration of therapy than the Beers list. On the Beers list many drugs are considered potentially inappropriate regardless of diagnosis or indication. For example, indomethacin is inappropriate per Beers, but per the Canadian criteria is okay short-term for acute gout. [5,15]

Valid concerns about using a "hit list" approach to inappropriate prescribing have been raised. Concerns include paucity of evidence, lack of allowance for exceptions (e.g., palliative care), and misuse resulting in patient harm. [16]

Also, research that provides a complete picture of diagnoses, drug dose and duration, as well as potential drug interactions and adverse drug effects, is lacking. [17,18]

Several studies have examined the association between use of drugs on the Beers list and healthcare outcomes. Most have been retrospective cohort studies. A systematic review of these studies revealed an association between use of Beers list medications and hospitalization in community-dwelling elderly. However, there was no association with mortality or other healthcare use. Evidence for an impact on quality of life or cost was inconclusive. In nursing homes, there was no evidence of association with mortality. Association with hospitalization was inconclusive. For hospitalized elderly, evidence was insufficient to make any associations. [14] Clearly, prospective studies are needed to see if these criteria make a difference in patient outcomes.

The Bottom Line

Adverse drug effects may go unrecognized in the elderly because they are nonspecific (e.g., confusion, lethargy, falls). Many of the drugs on the Beers and Canadian lists are included because of sedative and anticholinergic adverse effects. CNS depressants can cause sedation and cognitive impairment in the elderly, resulting in difficulty with self-care and falls. Anticholinergics (e.g., diphenhydramine, amitriptyline) cause cognitive problems by adding to the age-related decrease in cholinergic transmission. [2] Anticholinergics can also cause constipation and urinary retention. [2,18]

The chart above lists medicines that should be avoided in elderly patients based on the Beers list and Canadian criteria. Drugs on this list are not contraindicated, but should be used cautiously, with consideration of alternatives. For example, low-dose mitriptyline (*Elavil*) may be helpful for peripheral neuropathy. [13] And although using propoxyphene (*Darvon*) is not "wrong," better analgesics are available. Make decisions based on the whole patient, taking into account their medical, social, and psychological conditions, prognosis, and quality of life [Evidence level C; consensus]. [16]

The Beers list is only one tool for reducing adverse drug events in the elderly. Drugs not on the Beers list can also cause trouble in the geriatric population (e.g., glyburide [*Micronase*]-induced hypoglycemia). [20] Consider recommendations from pharmacists and computerized alerts, periodic medication review, and patient education [Evidence level B; systematic review]. [21] These methods have been shown to improve prescribing in the elderly; however, keep in mind they have not been shown to decrease adverse events. [21] See our *Detail-Document* #221211, "Emergency Department Visits Due to Adverse Drug Events," and *Detail-Document* #190822, "Drugs to Avoid in Patients with Dementia" for more tips.

Levels of Evidence

In accordance with the trend towards Evidence-Based Medicine, we are citing the **LEVEL OF EVIDENCE** for the statements we publish.

Level	Definition
A	High-quality randomized controlled trial (RCT) High-quality meta-analysis (quantitative systematic review)
B	Nonrandomized clinical trial Nonquantitative systematic review Lower quality RCT Clinical cohort study Case-control study Historical control Epidemiologic study
C	Consensus Expert opinion
D	Anecdotal evidence In vitro or animal study

Adapted from Siwek J, et al. How to write an evidence-based clinical review article. *Am Fam Physician* 2002;65:251-8.

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